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EXAMINER	
KIM, HEE-YONG	

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2482	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PUSDKT@EM-LG.COM

Office Action Summary	Application No.	Applicant(s)	
	10/574,023	REZNIC ET AL.	
	Examiner	Art Unit	
	HEE-YONG KIM	2482	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 11 May 2011.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 12-54 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 12-54 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 11, 2011 has been entered.

Response to Amendment

2. **Claims 12, 26, 42, and 50** have been amended.

3. **Claims 12-54** are pending.

Response to Arguments

4. Applicant's arguments with respect to the prior art rejection over **claims 12-54** have been considered but they are not persuasive.

5. Regarding independent **claims 12, 26, 42 and 50**, Applicant argues (pp.13-14) that Schreiber does not teach invention because Schreiber suggest video transmission technique based on MPEG and therefore the coarse portion is based on a prior or future image frame of video, but the claimed invention has its own coarse representation. Examiner respectfully disagrees. Examiner respectfully disagrees and would like to

point out that the reference (Schreiber) has to be read as a whole. Schreiber shoes in the Pyramid coding (Fig.6) the prediction based Motion compensation using previous or post frame. However, this is a just one example of the coder using Pyramid coding (Fig.1). For claims 26, 42 and 50, it was well known that motion estimation requires computation complexity and it was obvious to try the coder without Motion Compensation by only using transformation (TRANSFORM, Fig.6; DCT or wavelet transform) of low passed filtered signal and transmitting coefficients, which is similar to Intra coding of MPEG or JPEG (Schreiber: pp.958) (JPEG is not doing any motion compensation and only does intra coding), in order to reduce complexity of the coder. Regarding claim 12, the examiner proposes substituting the source coding based on MPEG (Fig.6) for the level 1 (coarse portion) with near-lossless encoder, in order to provide low complexity compression.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. **Claims 26, 28-29, 33-34, 36, 37, and 39-40** are rejected under 35 U.S.C. 102(b) as being anticipated by Schreiber (Proceedings of the IEEE, vol.83, No.6).

Regarding **claim 26**, Schreiber discloses Advanced Television Systems for Terrestrial Broadcasting: Some Problems and Some Proposed Solutions. Schreiber

specifically discloses A method of transmitting video images, comprising:

providing a first video image frame (Video In, Fig.1);

compressing the first video image into a coarse portion (coder 1,Fig.1);

representing a difference (subtracted from original video, Fig.1) between the coarse portion (output of decoder 1, Fig.1; Fig.6 without Motion Compensation) and a set of pixels of the first video image (video in, Fig.1) by a refinement portion (output of coder 2, Fig.1) in value form (examiner maintains that the difference is a numerical value such as pixel difference);

mapping the coarse portion and at least part of the refinement portion into symbols of a constellation (Fig.7 Constellation), such that spatial proximity between two symbols, each of which two symbols is associated with a different respective refinement value (Fig.7 shows the hybrid constellation - 64 PSK digital signal (coarse symbol) which should be dots in the constellation with 64 angular directions without line segments, and the analog signal is represented by the length of lines at each digital signal constellation), is related to a numeric proximity (Refinement portion is representation of the residual - subtraction of coarse signal from the original signal as shown in Fig.1) between the respective refinement values; wherein the refinement portion is mapped uncompressed (higher levels of th coder generates analog signal, pp.974, second col, last line); and transmitting the mapped symbols to a receiver (Transmitter at Fig.8).

Regarding **claim 28**, Schreiber discloses everything claimed above (see claim 26). Schreiber further discloses wherein mapping the portions comprises mapping the

coarse and refinement portions separately into symbols and superimposing the symbols onto each other (Schreiber: Fig.7 Hybrid Constellation).

Regarding **claim 29**, Schreiber discloses everything claimed above (see claim 28). Schreiber further discloses wherein mapping the portions comprises mapping the refinement portion into symbols of a constellation having a side to side distance smaller than the distance between the symbols of a constellation of the symbols of the coarse portion (Schreiber: Fig.7). Examiner interprets the side to side distance as angular distance between the digital signals. Therefore the refinement portion (analog signal in Schreiber) does not have this component (zero distance), but has a perpendicular component.

Regarding **claim 33**, Schreiber discloses everything claimed above (see claim 26). Schreiber further discloses wherein representing the difference by a refinement portion comprises determining for each pixel a difference between the coarse portion and the provided image and wherein each value of the refinement portion represents a difference (subtracted from original video, Fig.1) between the coarse portion and the provided image at a point on the image.

Regarding **claim 34,** Schreiber discloses everything claimed above (see claim 33). Schreiber further discloses wherein each value of the refinement portion represents a difference between the coarse portion and the provided image at a point on the image coinciding with a pixel (subtracted from original video, Fig.1, it was anticipated that subtraction is done by pixel by pixel).

Regarding **claim 36,** Schreiber discloses everything claimed above (see claim 26). Schreiber further discloses wherein mapping the portions comprises mapping the refinement portion into symbols of a constellation having a bin (angular distance between neighboring constellations in Fig.7) for each of the possible values of the difference between the coarse portion and the provided image for a specific point on the image.

Regarding **claim 37,** Schreiber discloses everything claimed above (see claim 26). Schreiber further discloses wherein the refinement portion is mapped uncoded (Analog, Schreiber: Level 2 Analog, Fig.8) into symbols. Examiner maintains that the refinement portion can be transmitted either by Level 2 digital only or by Level 2 Analog only in Schreiber (Fig.8) without level 3.

Regarding **claim 39,** Schreiber discloses everything claimed above (see claim 26). Schreiber further discloses wherein the coarse portion is protected by a forward error correction code Schreiber: FEC, Fig.8), while the refinement portion (Schreiber: Level 2 Analog, Fig.8) is transmitted without protection by a forward error correction code.

Regarding **claim 40,** Schreiber discloses everything claimed above (see claim 26). Schreiber further discloses wherein mapping the portions comprises mapping the refinement portion into a constellation having a discrete number of possible values (digital, Level 2 Digital, Fig.8). Examiner maintains that the refinement portion can be transmitted either by Level 2 digital only or by Level 2 Analog only in Schreiber (Fig.8) without level 3.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 12-22, 24-25, 27, 31-32, 35 and 38** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber in view of Seroussi (US 5,764,374), hereafter referenced as Seroussi.

Regarding **claim 12**, Specifically Schreiber discloses A method of transmitting video images (Fig.1), comprising:

providing a first video image frame (Video In, Fig.1);

compressing the first video image into a coarse portion (coder 1, Fig.1);

representing the difference (subtracted from original video, Fig.1) between the coarse portion (output of decoder 1, Fig.1) and the pixels of the provided first video image frame (Video in) by a refinement portion (output of coder 2, Fig.1) in value form;

mapping the coarse portion and at least part of the refinement portion into symbols of a constellation (Fig.7 Constellation), such that spatial proximity between two symbols, each of which two symbols is associated with a different respective refinement value (Fig.7 shows the hybrid constellation - 64 PSK digital signal (coarse symbol) which should be dots in the constellation with 64 angular directions without line segments, and the analog signal is represented by the length of lines at each digital signal constellation), is related to a numeric proximity (Refinement portion is representation of

the residual - subtraction of coarse signal from the original signal as shown in Fig.1) between the respective refinement values; and

transmitting the mapped symbols to a receiver (Transmitter at Fig.8).

However Schreiber fails to disclose a bounded difference from the provided image, for a set of the pixels of the first video image frame.

In the analogous field of endeavor, Seroussi discloses System and Method for Lossless Image Compression Having Improved Sequential Determination of Golomb Parameter. Seroussi specifically discloses near –lossless compression based on a bounded difference from the provided image (Uniform bound E (e.g. 1, 2, 5, 7) on the difference between each original pixel and its decoded pixel, col.25, line 40-43), for a set (all the pixels) of the pixels of the first video image frame, in order to provide low complexity compression (col.6, line 54-56).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by substituting the source coding based on MPEG (Fig.6) for the level 1 (coarse portion) with near-lossless encoder, in order to provide low complexity compression. The Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near – lossless compression based on a bounded difference from the provided image, has all the features of claim 12.

Regarding **claim 13**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein

compressing the video image comprises compressing such that the difference between the coarse portion and the provided image is bounded for substantially all the pixels of the image (all the pixels in image).

Regarding **claim 14**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein compressing the video image comprises compressing such that the difference between the coarse portion and the provided image is bounded to have at most ten different possible values (Seroussi: Uniform error bound 4 (col.25, line 40-43), means 0, +/-1, +/-2, +/-3, +/-4, which has 9 different possible values).

Regarding **claim 15**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein compressing the video image comprises compressing such that the difference between the coarse portion and the provided image is bounded to have at most five different possible values (Seroussi: Uniform error bound 2 (col.25, line 40-43), means 0, +/-1, +/-2, which has 5 different possible values).

Regarding **claim 16**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein the difference between the coarse portion and the provided image is bounded by a maximal value which is less than 5% of the possible values of the provided images,

because the pixel is usually represented by 8 bits and therefore there are 256 possible values and 5% of 256 is about 13. Seroussi already discloses uniform bound 1, 2, 5, and 7 which are less than 5% of possible values.

Regarding **claim 17**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein compressing the video image comprises compressing such that the difference between the coarse portion and the provided image is bounded for substantially all the color components representing the image (Seroussi: color space (RGB or YUV), col.1, line 56).

Regarding **claim 18**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein mapping the portions comprises mapping the coarse and refinement portions separately into symbols and superimposing the symbols onto each other (Schreiber: Fig.7 Hybrid Constellation).

Regarding **claim 19**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 18, discloses wherein mapping the portions comprises mapping the refinement portion into symbols of a constellation having a side to side distance smaller than the distance between the symbols of a constellation of the symbols of the coarse portion (Schreiber: Fig.7).

Examiner interprets the side to side distance as angular distance between the digital signals. Therefore the refinement portion (analog signal in Schreiber) does not have this component (zero distance), but has a perpendicular component.

Regarding **claim 20**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein the coarse portion is protected by a forward error correction code Schreiber: FEC, Fig.8), while the refinement portion (Schreiber: Level 2 Analog, Fig.8) is transmitted without protection by a forward error correction code.

Regarding **claim 21**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein the refinement portion is mapped uncoded (Analog, Schreiber: Level 2 Analog, Fig.8) into symbols. Examiner maintains that the refinement portion can be transmitted either by Level 2 digital only or by Level 2 Analog only in Schreiber (Fig.8) without level 3.

Regarding **claim 22**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein mapping the portions comprises mapping the refinement portion into a constellation having a discrete number of possible values (Schreiber: digital, Level 2 Digital, Fig.8). Examiner maintains that the refinement portion can be transmitted either by Level 2 digital only or by Level 2 Analog only in Schreiber (Fig.8) without level 3.

Regarding **claim 24**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein representing the difference between the coarse portion and the video image by a refinement portion formed of a plurality of refinement sub-portions, each of which has a smaller side to side constellation size (Schreiber: Fig.7). Examiner interprets the side to side distance as angular (circumferential) distance between the digital signals. Therefore the refinement portion (analog signal in Schreiber) does not have this component (zero distance), but has a perpendicular (radial) component.

Regarding **claim 25**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein the coarse and refinement portions (Layered coding with Near-lossless encoding with coarse portion) together represent the video image in a non-compressed standard (Not a compression standard such as MPEG) representation of color video with at most slight filtering (No filtering).

Regarding **claim 27**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, as applied to claim 12, discloses wherein compressing the video image comprises compressing such that the difference between the coarse portion and the provided image is bounded (Seroussi: Uniform bound E (e.g.

1, 2, 5, 7) on the difference between each original pixel and its decoded pixel, col.25, line 40-43) for substantially all the pixels of the image (all the pixels in image).

Regarding **claim 31**, Schreiber discloses everything claimed above (see claim 26). However, Schreiber fails to disclose wherein representing the difference by a refinement portion comprises determining for each pixel a difference between the coarse portion and the provided image and wherein each value of the refinement portion is related to at most 100 pixels of the image.

Seroussi specifically discloses a near lossless compression using prediction based on already encoded 6 neighboring pixels (Fig.3), in order to provide low complexity compression (col.6, line 54-56).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by substituting the source coding based on MPEG (Schreiber: Fig.6) for the level 1 (coarse portion) with near lossless compression using prediction based on already encoded 6 neighboring pixels, as taught by Van, in order to provide low complexity compression. The Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near lossless compression using prediction based on already encoded 6 neighboring pixels, has all the features of claim 31.

Regarding **claim 32**, Schreiber discloses everything claimed above (see claim 26). However, Schreiber fails to disclose wherein representing the difference by a refinement portion comprises determining for each pixel a difference between the

coarse portion and the provided image and wherein each value of the refinement portion is related to at most 10 pixels of the image.

Seroussi specifically discloses a near lossless compression using prediction based on already encoded 6 neighboring pixels (Fig.3), in order to provide low complexity compression.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by substituting the source coding based on MPEG (Fig.6) for the level 1 (coarse portion) with near lossless compression using prediction based on already encoded 6 neighboring pixels, as taught by Van, in order to provide low complexity compression. The Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near lossless compression using prediction based on already encoded 6 neighboring pixels, has all the features of claim 12.

Regarding **claim 35**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near lossless compression using prediction based on already encoded 6 neighboring pixels, as applied to claim 31 and 33, discloses wherein at least one value of the refinement portion represents a difference between the coarse portion and the provided image at a point on the image interpolated for two or more neighboring pixels (Seroussi: Fig.3 shows prediction based on interpolation of 6 neighboring pixels).

Regarding **claim 38**, the Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near lossless compression using

prediction based on already encoded 6 neighboring pixels, as applied to claim 31 and 33, discloses wherein the refinement portion is mapped without undergoing a transform into a non-image domain (there is no transformation to other domain in near lossless compression).

10. **Claims 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber in view of Seroussi, further in view of Shattil (US 2004/0,141,548), hereafter referenced as Shattil.

Regarding **claim 23**, Schreiber and Seroussi disclose everything claimed above (see claim 12). However, they fail to disclose wherein transmitting the mapped symbols comprise transmitting over a multi-input multi-output MIMO link.

In the analogous field of endeavor, Shattil discloses Software Adaptable High Performance Multicarrier Transmission. Shattil specifically discloses wherein transmitting the mapped symbols comprise transmitting over a multi-input multi-output MIMO link (MIMO, paragraph 233), for the purpose of PAPR-reduction (paragraph 133).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber and Seroussi by specifically providing transmitting the mapped symbols over a multi-input multi-output MIMO link, for the purpose of PAPR-reduction. The Schreiber Multiresolution source and channel coding, substituting source encoder with the Seroussi near –lossless compression based on a bounded difference from the provided image, further incorporating the Shattil transmitting the mapped symbols over a multi-input multi-output

MIMO link, has all the features of claim 23.

11. **Claim 30** is rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber in view of Shattil.

Regarding **claim 30**, Schreiber discloses everything claimed above (see claim 26). However, Schreiber fails to disclose wherein transmitting the mapped symbols comprise transmitting over a multi-input multi-output MIMO link.

Shattil specifically discloses wherein transmitting the mapped symbols comprise transmitting over a multi-input multi-output MIMO link (MIMO, paragraph 233), for the purpose of PAPR-reduction (paragraph 133).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by specifically providing transmitting the mapped symbols over a multi-input multi-output MIMO link, for the purpose of PAPR-reduction The Schreiber Multiresolution source and channel coding, incorporating the Shattil transmitting the mapped symbols over a multi-input multi-output MIMO link, has all the features of claim 30.

12. **Claim 41** is rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber.

Regarding **claim 41**, Schreiber discloses everything claimed above (see claim 26). In addition, Schreiber teaches wherein mapping the portions comprises mapping the refinement portion into a constellation such that its value degrades gracefully with

noise (analog transmission of refinement portion (level 2 analog) in Fig.8, because it was well known that analog transmission degrades gracefully with noise compared to digital transmission which has a cliff effect).

13. **Claims 42-44, 46, and 49** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber in view of Taubman (US 6,778,709), hereafter referenced as Taubman.

Regarding **claim 42**, Schreiber discloses A method of transmitting video images, comprising:

providing a first video image frame (Video In, Fig.1);

compressing the first video image into a coarse portion (coder 1,Fig.1)), having a first average number of bits per pixel (bits per pixel is calculated from bit rates of video compression and frames/sec and pixels in frame);

representing a difference (subtracted from original video, Fig.1) between the coarse portion (output of decoder 1, Fig.1) and a set of pixels of the first video image (video in, Fig.1) by a refinement portion (output of coder 2, Fig.1) in value form (examiner maintains that the difference is a numerical value such as pixel difference);

mapping the coarse and refinement portions into symbols of a constellation (Fig.7 Constellation) in value form,

such that spatial proximity between two symbols, each of which two symbols is associated with a different respective refinement value (Fig.7 shows the hybrid constellation - 64 PSK digital signal (coarse symbol) which should be dots in the

constellation with 64 angular directions without line segments, and the analog signal is represented by the length of lines at each digital signal constellation), is related to a numeric proximity (Refinement portion is representation of the residual - subtraction of coarse signal from the original signal as shown in Fig.1) between the respective refinement values;_and

transmitting the mapped symbols to a receiver (Transmitter at Fig.8).

However Schreiber fails to disclose having an average equivalent bit rate of the refinement portion requiring a greater number of bits per pixel, for representation, than the first average number.

In the analogous field of endeavor, Taubman discloses Embedded Block Coding With Optimized Truncation. Taubman specifically discloses having an average equivalent bit rate of the refinement portion requiring a greater number of bits per pixel, for representation, than the first average number (0.25 bits per pixel for the first layer, 0.5 bits per pixel for the second layer, col.14, line 14-18), in order to provide efficient bit rate control (col.2, line 12-13).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by specifically providing higher average bit rate for the enhanced layer compared to the bitrate of coarse layer, as taught by Taubman, in order to provide efficient bit rate control. The Schreiber Multiresolution source and channel coding, incorporating the Taubman higher average bit rate for the enhanced layer compared to the bitrate of coarse layer, has all the features of claim 42.

Regarding **claim 43**, Schreiber and Taubman disclose everything claimed above (see claim 42). Schreiber further discloses wherein the refinement portion is not represented by bits (Level 2 Analog, Fig.8).

Regarding **claim 44**, Schreiber and Taubman disclose everything claimed above (see claim 42). Schreiber further discloses wherein the refinement portion has a predetermined number of values for each symbol. (Level 2 Digital Fig.8, without analog portion).

Regarding **claim 46**, Schreiber and Taubman disclose everything claimed above (see claim 42). Schreiber further discloses wherein mapping the portions comprises mapping the coarse and refinement portions separately into symbols and superimposing the symbols onto each other (Fig.7).

Regarding **claim 49**, the Schreiber Multiresolution source and channel coding, incorporating the Taubman higher average bit rate for the enhanced layer compared to the bitrate of coarse layer, as applied to claim 42, discloses wherein the average equivalent bit rate of the refinement portion requires for representation at least twice the number of bits from the first average number (Taubman: 0.25 bits per pixel for the first layer, 0.5 bits per pixel for the second layer, col.14, line 14-18).

14. **Claims 45 and 47-48** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber in view of Taubman, further in view of Seroussi.

Regarding **claim 45**, Schreiber and Taubman disclose everything claimed above (see claim 42). Schreiber and Taubman fail to disclose wherein compressing the video

image comprises compressing such that the difference between the coarse portion and the provided image is bounded to have at most ten different possible values.

Seroussi specifically discloses near-lossless encoder compressing the video image comprises compressing such that the difference between the coarse portion and the provided image is bounded to have at most ten different possible values. (Uniform bound E (e.g. 1, 2, 5, 7) on the difference between each original pixel and its decoded pixel, col.25, line 40-43), in order to provide low complexity compression (col.6, line 54-56).

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by substituting source encoder with the Seroussi near-lossless encoder, as taught by Seroussi, in order to provide low complexity compression. The Schreiber Multiresolution source and channel coding, incorporating the Taubman higher average bit rate for the enhanced layer compared to the bitrate of coarse layer, further substituting source encoder with the Seroussi near-lossless encoder, has all the features of claim 45.

Regarding **claim 47**, the Schreiber Multiresolution source and channel coding, incorporating the Taubman higher average bit rate for the enhanced layer compared to the bitrate of coarse layer, further substituting source encoder with the Seroussi near-lossless encoder, as applied to claim 45, discloses wherein representing the difference by a refinement portion comprises determining for each pixel a difference between the coarse portion and the provided image and wherein each value of the refinement

portion is related to at most 10 pixels of the image (Seroussi: Fig.3 shows the prediction based on 6 neighboring pixels).

Regarding **claim 48**, the Schreiber Multiresolution source and channel coding, incorporating the Taubman higher average bit rate for the enhanced layer compared to the bitrate of coarse layer, further substituting source encoder with the Seroussi near-lossless encoder, as applied to claim 45, discloses wherein the coarse portion is protected by a forward error correction code (Schreiber: FEC, Fig.8), while the refinement portion (Schreiber: Level 2 Analog, Fig.8) is transmitted without protection by a forward error correction code.

15. **Claims 50-54** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schreiber in view of Van (US 2003/0,179,938).

Regarding **claim 50**, Schreiber discloses A method of transmitting video images, comprising:

providing a first video image frame (Video In, Fig.1);

compressing the first video image frame into a coarse portion (coder 1, Fig.1);

representing the difference (subtracted from original video, Fig.1) between the coarse portion (decoder 1, Fig.1) and a set of pixels of the first video image frame (video In, Fig.1) by a refinement portion (output of coder 2, Fig.1) in value form;

mapping the coarse and refinement portions into symbols of a constellation (Fig.7 Constellation),

such that spatial proximity between two symbols, each of which two symbols is associated with a different respective refinement value (Fig.7 shows the hybrid constellation - 64 PSK digital signal (coarse symbol) which should be dots in the constellation with 64 angular directions without line segments, and the analog signal is represented by the length of lines at each digital signal constellation), is related to a numeric proximity (Refinement portion is representation of the residual - subtraction of coarse signal from the original signal as shown in Fig.1) between the respective refinement values; and transmitting the mapped symbols to a receiver (Transmitter at Fig.8).

However, Schreiber fails to disclose using a near lossless compression for coarse portion and method achieving less than a 15:1 compression ratio.

In the analogous field of endeavor, Van discloses Device and Method for Compressing a Signal. Van specifically discloses near lossless compression based on a desirable compression ratio (paragraph 6 and 7), in order to combat a limited bandwidth (paragraph 6). The compression ratio is dictated by a limited bandwidth, which could be less than 15:1.

Therefore, given this teaching, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify Schreiber by substituting the source coding based on MPEG (Fig.6) for the level 1 (coarse portion) with near lossless compression based on desirable compression ratio of less than 15:1, as taught by Van, in order to combat a limited bandwidth. The Schreiber Multiresolution source and

channel coding, substituting source encoder with the Van near lossless compression based on desirable compression ratio of less than 15:1, has all the features of claim 50.

Regarding **claim 51**, Schreiber and Van disclose everything claimed above (see claim 50). Schreiber further discloses wherein mapping the portions comprises mapping the coarse and refinement portions separately into symbols and superimposing the symbols onto each other (Fig.7).

Regarding **claim 52**, Schreiber and Van disclose everything claimed above (see claim 51). Schreiber further discloses wherein the coarse portion is protected by a forward error correction code (Schreiber: FEC, Fig.8), while the refinement portion (Schreiber: Level 2 Analog, Fig.8) is transmitted without protection by a forward error correction code.

Regarding **claim 53**, Schreiber and Van disclose everything claimed above (see claim 50). Van teaches wherein compressing the video image comprises compressing with a compression ratio of less than 8:1 (Van: a desirable compression ratio, paragraph 6, could be 8:1 because of limited bandwidth).

Regarding **claim 54**, Schreiber and Van disclose everything claimed above (see claim 50). Van teaches wherein compressing the video image comprises compressing with a compression ratio of less than 12:1 (Van: a desirable compression ratio, paragraph 6, could be 12:1 because of limited bandwidth).

Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HEE-YONG KIM whose telephone number is (571)270-3669. The examiner can normally be reached on Monday-Thursday, 8:00am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christopher Kelley can be reached on 571-272-7331. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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